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filled off, there was no throw. Thirty substances were tested as electrolytes. They in general showed the above phenomena, excepting that the acids which evolve hydrogen when electrolyzed showed it very feebly. Experimenting to find the cause of the gradual reversal of the deflection after the first throw, it was found that any agitation of the liquid produces the same effect, and that when diffusion was prevented, by using fine sand in the vessel or by using gelatine with the solutions, the first throw only remained. The small effect with the hydrogen-evolving acids is probably due to the mechanical protection of the point by the bubbles of gas. Cobalt and nickel were tried and found to give similar effects but smaller. From their experiments the authors come to the conclusion that the particles of magnetic material on the plates are governed by the general laws of magnetic attraction and are held in place against chemical action as they would be against a mechanical force. The rate of change of force at a point is, of course, greater than that on a plane surface, hence the metal on the point is to some extent protected against chemical action, and acts as the electro-negative metal in the circuit. The general rule stated is as follows: When the magnetic metals are exposed to chemical action in a magnetic field, such action is decreased or arrested at any points where the rate of variation of the square of the magnetic force tends to a maximum. The authors criticise a paper on the same subject by Professor Nichols of Cornell, whose results are directly opposite to their own, as far as the two experiments touch. They claim that besides giving no explanation of or drawing any deduction from his results, he has in some cases mistaken disturbances for the real phenomena. The paper seems to explain the phenomena simply and naturally without the help of new relations or hypotheses.

BOOK-REVIEWS.

L'art et la Poésie chez l'enfant. By BERNARD PEREZ. Paris, Ballière. 8°.

THE English translation of Perez's 'First Three Years of Childhood' has familiarized the English-reading public with the general plan of work and method of treatment of this French psychologist and educator. M. Perez is imbued with the idea that the unfolding of mental processes that goes on in every child and is so often the subject of literary effort can yield material for the scientific study of an important chapter in psychology. This psychogenesis in part changes its character with the relative importance of the natural and the artificial elements in the child's education, with the nature of the civilization that forms its environment, with hereditary and individual characteristics. These varying conditions affect differently the various psychological elements that go to the making of a human being, and make necessary different methods of study. In the chapter of 'Infant Psychology' that M. Perez now brings to notice, these varying conditions are of supreme importance; so much so that it seems impossible in some respects to describe the artistic efforts of children, but only of certain children. Nevertheless the path of progress is in so many respects similar, and the directions of artistic interest so unchanging in spite of national and other influences, that one feels something generic even if vague to be at the basis of it all. Again, that close analogy between the development of the individual and that of the race does not lose its application here. It is true that primitive art is far from all being alike, that the art of civilization of which it was the predecessor is no less variable; but from a psychologic point of view the development is generically alike in all cases. For example, we find that the excessive and gaudy decoration of the body is displayed by savages and young children; we find them preferring the same loud, boisterous airs in music, and equally lacking in a sense of the beauties of nature. We see, too, how the subject of serious use and adornment in one stage of civilization degenerates into a toy for the children of the succeeding stage; witness the drum, and the bow and arrow.

A survey of the many paths along which children find their way to the pleasures of art can be most easily attained by a *résumé* of the chapters of the volume before us. In the first chapter are treated the many forms of personal decoration visible in the toilet. We know how soon a child takes an interest in its costume.

how for girls especially the doll is valuable because it is a dressable article; and has not Lotze said that in the exaltation of the ego that is produced by the donning of a new dress is the root of self-consciousness? Taste in this direction is seldom good at first, but it takes its character so entirely from the environment that the psychologist can do little more than record the shifting of interest from one point to another that proceeds as the child matures. In the feeling for the beauties of nature, — the emotions inspired by the graceful, the sublime, the pleasures that flowers and scenery bring, — we have a higher and a later form of artistic interest. M. Perez describes very pleasantly, even if at times prolixly, the growth of these sentiments in different children of his own acquaintance, and records the corresponding descriptions in the autobiographies of eminent men and women. On the artificial side we have the growth of the social instincts, the art of making oneself agreeable, politeness, coquetry, and so on. In France at least this seems to develop precociously early, but the social position of the family must everywhere be the chief factor in its culture or neglect. Passing to the fine arts proper, music is doubtless to be accorded the foremost rank. We know that the most wonderful instances of precocious talent are to be found amongst musicians, and this is in many cases the first artistic pleasure that the child has. The human voice is a source of much pleasure to the child. The distinction between the soothing and the exciting forms of music is soon appreciated. The educational value of rhythm is recognized by all kindergartners. The many decorations of bones, of rocks, of pottery, by primitive peoples are not unlike the first scratches of a child. The things most frequently delineated are quite alike. Given a child, a lead pencil, and some paper, and the result can be predicted, with due allowance to the nationality and other circumstances of the child.

The play instinct is a very potent factor in the growth of artistic taste; performing on a musical instrument as well as acting still go by the name of 'playing.' Foreign personalities are so real to the child, his vivid imagination so easily assimilates them, that 'pretence,' acting, is a common and an early childish trait. The doll is the central figure about which the most thrilling dramas are composed and enacted; to the boy the putting on of a paper helmet and a wooden sword is enough to make him a soldier in thought and deed. Children act to court admiration, and with a normally weak distinction between fact and fiction goes a fondness for acting out what has originated in the realm of the imagination. Literary art is the latest of all acquisitions; but the first letters of a child, though lacking all merit, have a deep interest to the psychologist. To each of these topics M. Perez devotes a full chapter, and succeeds in producing a book which, though not in the strictest sense scientific and certainly not exhaustive or final, is none the less a worthy contribution to an interesting chapter of 'infant psychology.'

NOTES AND NEWS.

JAMES STEVENSON, late executive officer of the United States Geological Survey, died at the Gilsey House, New York, July 25. He was born in 1840, at Maysville, Ky. A more extended notice will appear next week.

— The buildings for the Paris Exhibition have made great progress during the last five or six weeks. According to the Journal of the Society of Arts, the large machinery hall at the south end of the Champs de Mars is now considerably more than half finished, and will probably be completed in another six weeks or two months. Considerable progress has been made with the fine art galleries; but, as they were not commenced until recently, they are not nearly so far advanced as the other parts of the building. The same remark applies to the other parts of the building for the classes included under the term 'liberal arts,' on the other side of the grounds. In this last-named building it is proposed to place a retrospective collection illustrating the progress of the arts and industries from the very earliest period. On the Esplanade des Invalides, the construction of the various small buildings with which it is to be filled has been commenced. This work has been deferred as late as possible, in order not to deprive the regiments quartered in that part of Paris of their remaining drill ground for

a longer period than was absolutely necessary. The roofs and ironwork of the long range of galleries extending along the Quai d'Orsay, and connecting the Champs de Mars with the Esplanade des Invalides, are now nearly all up. The side walls of these buildings have also been constructed for a considerable portion of their length, so that this part also of the Exhibition will be finished at no very distant date. The tower which will form so conspicuous a feature of the Exhibition has now reached about half its height. The two lower stories are now completed. The first one, forming the base, extends over a considerable area, and resembles in appearance a huge, four-legged table or stand. Its height is about 250 feet, or a quarter of the whole. On the top of this is placed the second story, of about 200 feet high; and from this second story springs the tapering column of between 500 and 600 feet in height. The point now reached is the summit of the second story. Access is obtained by means of an iron staircase built into the framing of the tower; but the guides in which the lifts will work are already in place, and when the tower is finished, the various stages will of course be reached by means of these lifts. The foundations are sunk a great depth into the ground, which at this place — close to the bank of the Seine — is less suited for bearing a weight such as a tower than the limestone rock which underlies the greater part of Paris. Great precautions have been taken to render the tower safe from lightning. It forms, of course, a conductor in itself, but, to insure proper connection with the earth, at each corner a large tube has been sunk a considerable distance into the soil, and these tubes it is proposed to keep full of water. Good electrical connection is made between the tubes and the framework of the tower itself. It remains to be seen whether a building of this enormous height will carry off electricity safely in consequence of its excellent conducting powers, or whether it might not suffer from a shock of more than usual violence. The site is certainly ill-chosen to enable the tower to make the most of its height, since it is on some of the lowest ground in Paris, and in spite of the enormous height of the building itself, at the present time, its top is now only on a level with the summit of the towers of the Trocadero Palace, a building which, though much inferior in size, stands on the high ground on the other side of the Seine. The French executive report favorably as to the exhibits which they expect to receive from foreign countries. Considerable sums have been voted, among others, by various of the South American States, as well as by the United States, and by Belgium. The Spanish government, though not officially represented, has voted a large sum towards the Exhibition, and it is said that the unofficial committees in various of the European States are most of them successful in securing a representation of their several countries.

— Augusta, Ga., the largest cotton manufacturing centre in the South, is prominent among Southern cities this year, as the site of the Augusta National Exposition, to take place Oct. 10 to Nov. 17, 1888. No outside aid has been asked, and no government appropriation been made. The project is a conspicuous and commendable one in this respect. The Exposition aims to be national in scope. Many of the largest manufacturers North and West will be represented, and an extensive government display from all the executive departments and branches of the consular service are already secured. But the most complete representation will be secured of all the Southern industries and of the development of the resources of fields, forests, and mines that has taken place in the last ten years.

— The International Congress of 'Americanists' will hold its seventh session in Berlin from October 2 to 5 next. The organizing committee has just issued the programme. The first day will be devoted to questions relating to the discovery of the New World, to the history of America before the time of Columbus, and to American geology; the second to archaeology; the third to anthropology and ethnography; the fourth to philology and palæography.

— On July 9 the atmosphere in the English Channel became so rarefied that objects could be seen with extraordinary distinctness at a distance of between thirty and forty miles from Dover and Folkestone. *Nature* says that the lighthouse at Cape Grisnez, Calais, and the dome of the Cathedral, and Napoleon's Column at

Boulogne could be distinctly seen with the naked eye, and every prominent object could be picked out along the French coast. The distance from Dover to Boulogne as the crew flies is twenty-eight miles, and the column is about two miles further inland.

— We learn from *Nature* that at the next meeting of the British Association there will be a discussion in Section D on the vexed question of the formation of coral reefs. The discussion will be opened by Dr. Sydney J. Hickson.

— *Nature* states that the meeting which will shortly be held in Paris for the study of tuberculosis, under Professor Chauveau's presidency, promises to be very interesting and successful.

— The German ethnological and geographical expedition to the headwaters of the Xingu under the direction of Dr. Karl von den Steinen was expected in Rio de Janeiro early in July.

— The Sociedade de Geographia de Rio de Janeiro proposes to hold in September an exposition of geographical works relating to South America, for which the co-operation of nearly all the South American States has already been promised.

— Messrs. Ticknor & Co. announce for publication, August 4, 'A History of Presidential Elections,' by Edward Stanwood; new and enlarged edition; and 'Newspaper Libel, a Hand-book for the Press,' by Samuel Merrill, of the staff of the *Boston Globe*, and member of the bar of Massachusetts and of New York. — Lee & Shepard have in preparation 'Chips from Educational Workshops of Europe,' by Prof. L. R. Klemm; and 'Zoölogy Teaching for Beginners,' by W. P. Manton. — G. P. Putnam's Sons have just ready two books for the student of political economy and history. The first of these is entitled 'The Tariff History of the United States,' consisting of various essays by F. W. Taussig, which have already appeared in magazines or in book-form, and thus united present an almost complete history of tariff legislation from 1789 to 1887. The other is 'Industrial Liberty,' by John M. Bonham, who aims to keep in view the principles rather than the statistics of his subject, and makes an analysis of the salient political and industrial evils of our time. — Little, Brown & Co. have now ready 'The Origin of Species by Means of Natural Selection; or, the Preservation of Favored Races in the Struggle for Life,' by Charles Darwin, sixth edition, in new large type with additions and corrections. — E. & F. N. Spon, New York, announce *The Marine Engineer*, a monthly journal of marine engineering, shipbuilding, and river navigation; subscription, \$1.75; also, 'Crystal Models,' by John Gorman. Compared with others, the advantages resulting from this method become most strikingly apparent. The models are built up into form in a few seconds, and it is worthy of notice that, owing to the plaiting process being well-nigh instinctive, the manipulations after a short trial become almost automatic. The forms require no sticking at the edges.

— The Senate has amended the sundry civil appropriation bill by adding a grant of \$250,000 to pay the expenses of investigating the extent to which the arid region of the United States can be redeemed by irrigation. The proposed scope and extent of this investigation was fully explained in *Science* a few weeks ago.

— The United States Senate has voted to pay to the widow of the late Prof. Spencer F. Baird \$50,000 as compensation for his services as United States Fish Commissioner.

— It is proposed to celebrate in the winter of 1889-90 the sixth centennial of the foundation of the University of Montpellier.

LETTERS TO THE EDITOR.

* * * Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.

Twenty copies of the number containing his communication will be furnished free to any correspondent on request.

The editor will be glad to publish any queries consonant with the character of the journal.

A Standard Thermometric Scale.

AT its session last October the International Committee of Weights and Measures passed a resolution establishing a standard thermometric scale for the use of the International Weights and